CALIFORNIA HIGH-SPEED TRAIN

Program Environmental Impact Report/Environmental Impact Statement

FINAL DRAFT

ENVIRONMENTAL ANALYSIS METHODOLOGIES

November 7, 2002

Prepared for:

California High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration

CALIFORNIA HIGH SPEED RAIL AUTHORITY

U.S. Department of Transportation
Federal Railroad Administration

Environmental Analysis Methodologies

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1.0 INTRODUCTION

The California High-Speed Train Program is a 700-mile-long high-speed train system capable of speeds in excess of 200 miles per hour on a dedicated, fully grade-separated track with state-of-the-art safety, signaling, and automated train control systems. The system described would serve the major metropolitan centers of California, extending from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego. The high-speed train system is projected to carry a minimum of 42 million passengers annually by the year 2020.

The California High-Speed Rail Authority (Authority) is undertaking a Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the California high-speed train system to satisfy the environmental review process required by federal and state laws and to enable public agencies to select alternatives to pursue, select mitigation strategies, and to grant approvals and provide financial assistance necessary to preserve right of way and to implement initial segments of the system.

The Authority is both the project sponsor and the lead agency under the state California Environmental Quality Act (CEQA) requirements. The Authority determined that a Program EIR is the appropriate document for the project at this conceptual stage of planning and decision-making, which will involve defining and evaluating alternative technologies, corridors, station locations, and phasing options.

A Tier I Program-level EIS under the National Environmental Policy Act (NEPA) was selected as the appropriate environmental document due to the nature and scope of the comprehensive high-speed train system proposed by the Authority and the need to narrow the range of alternatives. The Federal Railroad Administration (FRA) is the federal lead agency in the preparation of the EIS, with the Federal Highway Administration (FHWA), the Army Corps of Engineers, U.S. Fish and Wildlife Service (USFWS), Federal Transit Administration (FTA), Federal Aviation Administration (FAA) and the Environmental Protection Agency (EPA) as cooperating federal agencies.

The California High-Speed Train Program EIR/EIS will consider a high-speed train system alternative, a no-build alternative, and a modal alternative (highway, air, conventional rail, etc.).

Later stages of project development will include project-specific Tier 2 detailed EIR/EIS documents to assess the potential impacts of the alternatives in those segments of the system identified for the initial implementation phase.

1.1 PURPOSE OF THESE METHODOLOGIES

The purpose of these Environmental Analysis Methodologies is to provide the direction necessary to the Regional and System-wide Analysis Teams to allow parallel analysis and consistent results for each alternative in each of the regions statewide.

A program-level environmental document means different things to different people. FRA's Procedures for Considering Environmental Impacts (64 FR 28545, March 26, 1999) states:

> *A programmatic environmental document should identify program-level alternatives and assess the program-wide environmental impacts. To the extent information is available, it should also identify the alternatives to and impacts of component FRA actions within the program, and the implications on alternative transportation systems.*

Under CEQA, the use of a program EIR enables the lead agency to:

> *. . . characterize the overall program as the project being approved at that time. Following this approach when individual activities within the program are proposed, the agency would be required to examine the individual activities to determine whether their*

> *effects were fully analyzed in the program EIR. If the activities would have no effects beyond those analyzed in the program EIR, the agency could assert that the activities are merely part of the program which had been approved earlier, and no further CEQA compliance would be required. This approach offers many possibilities for agencies to reduce their costs of CEQA compliance and still achieve high levels of environmental protection*

Because of the potential for a range of acceptable levels of detail in the program level analysis, it is imperative that we define both the extent of the study area and the scope of the environmental analyses prior to initiation of studies. Because the environmental document for which environmental analysis is being undertaken is a Program EIR/EIS, these Environmental Methodologies will define the level of analysis that will be undertaken at the program level and also the analysis that will, by necessity, be deferred to subsequent environmental reviews and documentation.

The scope or methodologies for all of the environmental analyses to be completed are presented together in this document for review and comment by the program team and involved resource agencies. The order of topics herein does not imply the order of topics in the Program EIR/EIS.

1.2 ORGANIZATION OF THIS REPORT

Subsequent to this introduction, this report is organized in one main chapter that contains draft analysis methodologies in summary/tabular format for each of the environmental study areas to be considered in the Program EIR/EIS. For each environmental area, an approach is presented for establishing the topic areas, study area, baseline conditions and analysis methodology for potential impacts and benefits, level of detail, and thresholds of significance. The appendices *(not currently a part of this submittal)* include detailed formatting and quality control instructions, in general, for all of the technical analyses.

1.3 DESCRIPTION OF PROJECT ALTERNATIVES

1.3.1 No-Build/No-Project/No-Action Alternative

The No-Build/No-Action Alternative is the baseline for comparing the potential environmental impacts and benefits of all alternatives being analyzed in the EIR/EIS. The No-Build Alternative describes the state's transportation system that serves the same intercity travel market as the other alternatives. It describes the highway, air, conventional rail, and bus facilities and operation that existed in 1999-2000 and as they will be after improvements that have been approved and funded in the fiscally constrained and conforming regional and state Transportation Improvement Programs (RTPs, STIP) and Airport Development Programs (ADPs) are in-place. When this financially constrained level of infrastructure improvement is analyzed with the significant growth in population and transportation demand that is projected to occur by 2020, the data shows that most highways and airports serving the intercity travel market would be at capacity, and the level of congestion would severely affect the reliability of travel and the travel time between major metropolitan cities in California.

As with all of the alternatives, the No-Build Alternative will be assessed against the purpose and need topics/objectives for congestion, safety, air pollution, reliability, and travel times.

1.3.2 Modal Alternative

There are currently four options for intercity travel between the major urban areas of California: vehicles on the interstate highway system and state highways, commercial airlines serving airports, conventional

passenger trains (Amtrak) on freight and/or commuter rail tracks, and long distance commercial bus transit. Air and highway are clearly the predominant modes for intercity trips and particularly intercity trips over 150 miles in length. The Modal Alternative will describe hypothetical future improvements consisting of expansion of highways and airports serving the same geographic areas as the proposed High-Speed Train System. The Modal Alternative is developed to provide an equivalent capacity to serve a "representative demand" for inter-city travel derived from the high-end sensitivity analysis completed for a representative year 2020 high-speed train system. The representative demand is based on the independent ridership and revenue forecasts prepared for the California High Speed Rail Authority[1].

For purposes of this analysis, the projected travel demand will be allocated to the highways and airports described under the No-Build Alternative, and used to identify improvements or facilities expansions that could serve the intercity travel demand at an equivalent level of capacity, regardless of funding potential and in lieu of high-speed train service.

The Modal Alternative represents a hypothetical, reasonable alternative to the proposed High-Speed Train System in the Program EIR/EIS. This Modal Alternative describes potential improvements to the highway and airport components of the statewide transportation system. The improvements assumed for each mode are capacity oriented (e.g., additional traffic lanes for highways with associated interchange reconfiguration and ramp improvements; additional gates and runways for airports with associated taxi ways, parking, and passenger terminal facilities).

In the development of the Modal Alternative, analyses were conducted to assess the appropriateness of accommodating the representative demand solely within a single mode of transportation (highway or aviation). It was concluded that neither mode, alone, would effectively serve the range of intercity trip lengths or purpose. Neither mode alone met the purpose and need/objectives of the project in terms of reliability, safety, or preservation of the state's natural resources. In addition, the extent of the improvements identified for each singular mode was beyond the reasonable limits of potential expansion of many of the existing facilities in that mode. For these reasons, the Modal Alternative is a hybrid alternative, comprised of future transportation improvement options for air and highway modes of intercity transportation. These multi-modal improvements represent an equivalent level of capacity to meet the representative demand.

1.3.3 High-Speed Train Alternative

The Authority has defined a proposed statewide high-speed train system capable of speeds in excess of 200 miles per hour (320 kilometers per hour) on dedicated, fully grade-separated tracks, with state-of-the-art safety, signaling and automated train control systems. Steel-wheel on steel rail technology will be considered for the system that would serve the major metropolitan centers of California (extending from Sacramento and the San Francisco Bay Area through the Central Valley, to Los Angeles and San Diego). Ridership for this system varied between 42 and 68 million passengers (up to 10 million riders are long-distance commuters) for 2020 and potential for significantly higher ridership beyond 2020. Sensitivity analyses using assumptions of increased costs and congestion of air and automobile travel resulted in the high end of the range of potential ridership.

A specific system of corridors was defined and considered to establish the ridership forecasts. Within this general framework, specific alignment and station options are used to represent the system. Where significant differences exist between alignment options in any segment, the differences will be considered and clearly presented in the analysis of the system alternatives. The "highest return on investment route" from the Authority's Business Plan will serve to represent the High-Speed Rail Alternative and will be used to develop the comparison and evaluation with the other system alternatives. The Program

[1] "Independent Ridership and Passenger Revenue Projections for High Speed Rail Alternatives in California, Draft Final Report, January 2000", prepared for the California High Speed Rail Authority prepared by Charles River Associates.

EIR/EIS analysis will identify a preferred combination of high-speed train alignment and station options to be evaluated and compared with the other system alternatives (No-Build and Modal Alternatives.

Throughout each region of the state numerous alignment and station options have been identified and selected for analysis in the EIR/EIS based on a comprehensive screening evaluation. These design options will be evaluated at the segment level in the Program EIR/EIS, and key differences in these areas will be addressed in the comparison of system alternatives. The major design options include:

- Northern Mountain Crossing –mountain crossing options through the Coastal Mountain Range between the Central Valley and the Bay Area. Primarily two options: the Pacheco Pass through Gilroy and a northern crossing more directly aligned with San Jose.
- Southern Mountain Crossing – mountain crossing optionss through the Tehachapi Mountain Range between Los Angeles and Bakersfield. Primarily two options: the I-5 corridor and a route through the Antelope Valley.
- Bay Area – service options to the Bay Area along the peninsula to San Francisco and/or the east bay to Oakland.
- Southern California - service to Orange County in addition to service to San Diego via the Inland Empire and the I-15 corridor.
- Shared Use Options – service to the urban centers on shared tracks with other passenger rail services. Based on the screening evaluation, the state of the art high-speed steel-wheel-on-steel-rail technology considered for the system must also be capable of sharing tracks with other services at reduced speeds in heavily urbanized areas (i.e., San Jose to San Francisco and Los Angeles to Orange County).
- Link to Los Angeles International Airport (LAX) – direct or transfer to other transit system.

For purposes of comparative analysis the HST corridors will be described from station-to-station within each region, except where a by-pass option is considered when the point of departure from the corridor will define the end of the corridor segment. All corridors and design options for HST will be shown on plans and profiles drawn on aerial photos.

1.4 INFORMATION TO BE PROVIDED TO ANALYSTS

Before the Regional Analysis Teams begin their work, detailed alternative definitions will be provided by the Regional Team Manager and Program Management Team. The definitions will include the following information:

Alignment Configuration Maps – including location of alignment and station options and general profile section (elevated, at-grade, trench or tunnel). This information will be provided by the Regional Team based on the engineering criteria and parameters developed by the Program Management Team.

Typical Cross-Section Drawings – including location of tracks and guideway facilities in relation to other adjacent facilities, corridor width from centerline of alignment options, height and width of proposed infrastructure facilities (elevated guideway, trackbed, etc.). This information will be provided based on the engineering criteria and parameters developed by the Program Management Team.

Station Requirements/Guidelines – including station track and platform configuration/layout for intermediate and terminal locations, platform size parameters, parking requirements, and other "footprint" related parameters. This information will be provided by the Program Management Team and will require application to the specific constraints and local conditions/policies of each location by the Regional Team.

Storage and Maintenance Facilities Needs – including general track configuration parameters and land area needs for storage and maintenance requirements in each region (or each station area, as applicable). This information will be provided by the Program Management Team and will require application to the specific constraints and local conditions/policies of each location by the Regional Team.

Shared Use Configuration Assumptions – addressing parameters for the definition of shared use (conventional and high-speed passenger services on shared corridors and tracks) segments of the system, including the overall concept for shared use of corridors and tracks such as train technology, track arrangement (express/local), station track and platform arrangements, level of grade separation, separation/clearances, and track bed requirements. This information will be provided by the Program Management Team and will require application to the specific constraints and local conditions/policies of each location by the Regional Team.

Operational Assumptions – including train frequencies, operating hours and volumes per day, maximum operating speeds per segment, relationship to other services (adjacent, shared, etc.). This information will be provided by the Program Management Team.

Ridership Information – based on available ridership information from the Business Plan forecasts for 2020 and the sensitivity analysis (high-end of range) including boardings/alightings for general station sites, modal split, etc. Assumptions regarding, long-distance commute and freight services/demand will also be documented. The ridership information must also identify other secondary ridership, such as improvements to other services from shared-use operations and the assumptions that should be made for these services. This information will be provided by the Program Management Team in conjunction with HSRA staff and the ridership consultant.

2.0 ENVIRONMENTAL ANALYSIS METHODOLOGIES

Methodologies for the environmental analyses to be completed in the Program EIR/EIS are presented in summary form on the following pages. In addition, for Energy and Farmlands a mock-up comparison table is included as examples of the type of information to be included and compared in each analysis at the program level. Each of the methodologies is organized in a similar fashion following the outline below. The summary format will allow for ease of review and modification during the review cycles with the regional teams and resource agencies.

SPECIFIC ANALYSIS
- * Baseline/Affected Environment (*in all cases "baseline" refers to current conditions in 2002)
  - TOPIC AREAS
  - DEFINING THE STUDY AREA
  - SOURCES
  - LEVEL OF DETAIL
- Environmental Impact Analysis
  - TOPIC AREAS
  - *ANALYSIS METHODOLOGY (OPERATIONAL AND CONSTRUCTION) (IN ALL CASES A FUTURE 2020 NO-BUILD WILL BE COMPARED WITH A FUTURE MODAL AND HST ALTERNATIVE)
  - LEVEL OF DETAIL
  - THRESHOLDS OF SIGNIFICANCE
  - ASSUMPTIONS OF COMPLIANCE WITH REGULATIONS/POLICIES
  - ANALYZING CUMULATIVE IMPACTS
  - SUBSEQUENT ENVIRONMENTAL ANALYSIS
- Mitigation Strategies and Subsequent Analysis
  - REQUIRED MITIGATION AND RECOMMENDED MITIGATION
- Products
  - PROGRAM MANAGEMENT TEAM
  - REGIONAL TEAM

The methodologies include information regarding the resulting products and the roles and responsibilities of those conducting the analyses. They also reflect the analyses and comparisons necessary with the No-Build and Modal Alternatives, as well as the High-Speed Train Alternative.

In most cases the required environmental analyses will be completed at the regional level (completed in each of the five study regions by the Regional Study Teams in parallel and compiled at the system-wide level by the Program Management Team). However, for some of the environmental elements it has been deemed more effective and appropriate at the program level to complete the analysis at a system-wide level. This is a key distinguishing factor and is noted in the method summaries in terms of the analysis and products required. In each case we have noted the alternatives to which the analysis is applicable. For example, when an analysis is applicable to all alternatives and design options we note: (No-Build, Modal and High-Speed Train Alternatives, as well as High-Speed Train Corridor and Station Options).

In all cases, agency coordination and access issues must be coordinated with the Regional Project Managers and the Program Management Team. The Program Management Team will remain the key coordination contact for state and federal resource agencies through continued Resource Agency Involvement Meetings and individual contact with appropriate Regional Team representation according to the issues at hand.

TRAFFIC, TRANSIT, CIRCULATION, AND PARKING

*Baseline

Topic Areas	*Study Area*	*Methodology*
• Highways, roadways, • Passenger Transportation Services (bus, rail, air, intermodal) • Goods Movement • Parking issue • Transit facilities	Transportation facilities (highways, roadways) that: • serve as the primary means of access to proposed rail station and airport facilities as well as highway/roadway improvements/new facilities in the Modal alternative. • are within 1 mile of proposed rail stations and (in the Modal alternative) airports and major routes along alignment/highway corridors	The **Regional Analysis Teams** will: • Identify primary routes to be considered including highways designated in the No-Build and Modal alternatives and all modes of access to the stations areas and airport areas in the HST and Modal Alternatives, respectively. The primary routes/modes of access for the stations and airports will consider reasonable assumptions for distribution of trips by direction. • Identify screenlines or cordons combining segments of the primary routes which reasonably represent locations for evaluating in the aggregate baseline traffic and public passenger transportation conditions (using data for 2002, 2020 as available) in the morning peak-hour. No new traffic counts will be made where data are not available, and the respective MPO regional travel forecasting models will be assumed sufficiently accurate for purposes of forecasting traffic on the screen-lines and cordon lines chosen. • Establish baseline (2002 and 2020 as available data allows) ratios of demand to capacity across each screenline or cordon for roadway and public transportation facilities. Use Highway Capacity Manual standards for capacity. • Characterize baseline conditions for goods movement (truck/freight) in the general area of study, primarily to identify key goods movement means/corridors. based on published sources. • Characterize baseline conditions for parking in the vicinity stations and airports. based on any 2002 parking reserves, local plans for major parking expansion, and adequacy of local parking codes for meeting No Build growth in demand. (These thresholds may be necessary for LA region but still seem high for Central Valley, especially for screenline or cordon totals. Could we use: High = increase traffic by more than 10% at locations operating at over 1.0 in No Build; Medium = increase traffic by more than 10% and increase V/C ratio from below 1.0 to over 1.0)

Impacts

Topic Areas	*Methodology*
• Trip generation • Impacts on Roadways • Impacts on Public Transportation Services • Impacts on Goods Movement • Parking Impacts	The **Regional Analysis Teams** will • Calculate trip generation by adding to baseline volumes forecasted 2020 demand for high-speed rail (using mode split assumptions provided by the PM consultant team) and (for the Modal alternative) airports, or highways comprising alternatives, plus local trips in 2020 generated by project-related development (as data are available) and trips due to induced growth provided by PM team consultant team. • Distribute additional trips to identified screenlines or cordons (roadway and public transportation) and add those trips to the appropriate baseline volumes for each screenline or cordon. • Distribute additional trips for selected segments/links on primary regional routes and modes of access to stations and similar facilities by adding No-Build volumes obtained from 2020 forecasts (from regional and local agencies), and 2020 travel demand generated by alternatives, to the key accessing facilities (roadways, transit links). This distribution can be done at a screenline level to reduce the subjectivity of assigning trips to specific facilities. o For each screenline or cordon (roadway and public transportation), characterize the impact of the alternative being analyzed using ratings of High, Medium, Low impact. High rating would result from worsening or resulting in a ratio of demand to capacity of 1:5. Medium rating would result from worsening or resulting in a ratio of demand to capacity of 1.0 to 1.5. Low

	impact would be all other results. These ratings would apply to either roadway or public transportation screenlines or cordons. If and as additional data are received (i.e.; trips from project, related development and induced growth), provide amended ratings with growth. • Identify affected goods movement corridors. Characterize effects as High, Medium or Low. • Characterize the potential impact on primary parking resources (i.e., if there is not sufficient parking—existing or to be provided by the alternative—to meet estimated future demand, a rating of High would apply). • Specify subsequent traffic, circulation, and parking analyses that will be required in the next phase.

Mitigation

- Identify mitigation strategies for avoidance of potential impacts related to traffic, transit, circulation and parking. Mitigations will involve subsequent analysis of traffic, circulation or parking in the next phase of work; to the extent possible, characterize the general scope of those analyses.

Products

Regional Analysis Teams	*Program Management Team*
• **Regional Traffic, Circulation, Transit and Parking Baseline Report:** o Primary routes and modes of access o Existing roadway conditions o Existing public transportation services conditions o Existing goods movement conditions o Existing parking conditions • **Regional Traffic, Circulation, Transit and Parking Impacts Report** o Trip generation o Trip access o Roadway impacts o Public transportation services impacts, multi-modal connections o Goods movement impacts o Parking issues o Subsequent analysis	• **System-wide Traffic, Circulation, and Parking Report** o Executive Summary o Baseline/Affected Environment ▪ Primary routes and modes of access ▪ Existing roadway conditions ▪ Existing public transportation services conditions (multi-modal connections) ▪ Existing goods movement conditions ▪ Existing parking conditions o Impacts ▪ Trip generation, including induced trips ▪ Trip access ▪ Roadway impacts ▪ Public transportation services impacts ▪ Goods movement impacts ▪ Parking issues ▪ Subsequent analysis required o Mitigation Strategies

* In all cases "Baseline" refers to current 2002 conditions

AIR QUALITY

Baseline

Topic Areas	*Study Area*	*Methodology*
• Local Meteorological Conditions • Local Monitored Air Quality • Ambient Air Quality Standards/ Attainment Status • Air Toxics • Relevant Pollutants o Carbon monoxide, Sulfur oxides, Nitrogen oxides, Ozone, Particulate matter, Lead, hydrocarbon	• Air basins traversed by alternative corridors for highway, HSR, airports	The **Program Management Team** will • Describe regulatory requirements. • Summarize the potential health effects of the seven air pollutants identified by EPA as being of concern nationwide. • Provide short description of the local meteorological conditions within the study area. • Provide short description of the local monitored data within each study area (air basin). • Summarize attainment status-related information for air basins.

Impacts

Topic Areas	*Methodology*

• Conformance with Air Quality Standards	The system-wide comparison of alternatives will be performed by the **Program Management Team**.
	• Compare annual tons of emissions (ROC, CO, NO, PM10/2.5) for No-Build, Modal, and HSR Alternatives
	• Discuss air toxics in baseline and impact analysis. Qualitative assessment of impact of each alternative.
	• Use an air quality screening or ranking analysis to determine which areas have the potential to experience air quality impacts due to the project.
	  o Conduct screening level analysis at locations selected because of high traffic volumes and/or levels of congestion and sensitive land uses around stations.
	  o Use procedures in Caltrans CO Protocol and EPA's CO Guidelines for screening analysis to identify potential CO hotspots.
	  o Discuss growth induced air quality impacts around stations and major interchanges selected.
	• Conduct mesoscale analysis in each affected air basin to estimate alternative's effects on emission of oxides of nitrogen and non-methane hydrocarbons.
	  o Determine compliance with the allowable emission budgets established by the SIP in each air basin.
	  o Use version of EMFAC program specified by CARB
	  o Base on areawide projections of ADT and corresponding vehicular speeds
	  o Use EPA's Compilation of Emission Factors (AP-42) for estimating emissions from the burning of fuels for the generation of electricity for the rail operations.
	  o Determine potential impacts (both positive and negative).
	  o Discuss Conformity issues with RTP.
	• Qualitative assessment of particulate matter, PM 10 and PM 2.5, for construction period, compare alternatives in Central Valley and LA basins. (Use tables provided by ARB to estimate construction dust.)
	• Specify subsequent air quality analyses that will be required for all projects. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis.

Mitigation

- Identify mitigation strategies to be incorporated into project designs to reduce impacts related to air quality; include off-road cleaner vehicles for construction (replacing uncontrolled

diesel engines) and controlling road construction dust.

Products

Program Management Team

- **System-wide Air Quality Report**
  - Baseline
    - Regulatory Setting
    - Air Basin Attainment Status
    - Health Effects
  - Impacts
    - Number of CO impacts
    - Other Potential Impacts
  - Conformity Issues

NOISE AND VIBRATION

Baseline

Topic Areas	*Study Area*	*Methodology*

• Existing noise levels: (Typical) highway, rail, air for sensitive land use categories
• Vibration
	Noise
	• HSR study areas from centerline
	  o Shared with existing rail line
	  ▪ urban/noisy suburban: 450 ft
	  ▪ quiet suburban/ rural: 900 ft
	  o Shared with existing highway
	  ▪ urban/noisy suburban: 450 ft
	  ▪ quiet suburban/ rural: 700 ft
	  o New corridor
	  ▪ urban/noisy suburban: 450 ft
	  ▪ quiet suburban/ rural: 900 ft
	• Highway study areas: 1000-foot from centerline
	• Airport study areas: existing noise contours
	
	Vibration
	• HSR study areas (buffer width from centerline):
	  o Residential – 220 ft.
	  o Institutional – 160 ft.
	• Highway study areas: 100 ft.
	• Airport study areas: NA
	• Rail: 600 ft.
		The **Regional Analysis Teams** will
		• Identify sensitive land uses (developed urban residential area, open space, park land, wildlife habitat, hospitals, and schools) within 1000 ft. of alternative corridors.
		• HSR study areas:
		  o Characterize existing noise based on FRA Manual Appendix B, Option 3; no measurement required.
		  o Assign noise level (Ldn) for noise-sensitive land uses in the study area, use table format
		• Highway study areas: 1000 feet from centerline; repeat above for roadways
		• Airport study areas: use existing noise contours in airport master plans
		• PMT will provide aerial photos, plans, profiles, and GIS mapping showing contours and population densities

Impacts

Topic Areas	*Methodology*
• Noise impacts • Vibration impacts	**Program Management Team** will • Provide text describing the general or typical regulatory setting.Provide GIS basemaps showing alternatives for each region, provide plans and profiles • Develop typical/representative noise levels for sensitive land use typologies along/around freeways, rail corridors and airports within the study area. • For joint-use corridors with existing rail, use FRA Horn Noise Model to assess benefits accrued by eliminating train horns at crossings

	NOISE The **Regional Analysis Teams** will • HSR alternatives: Reference Chapter 4 of the FRA guidance manual: Initial Noise Evaluation (consider length of train, frequency of pass-by, speed as shown in manual): o Describe generic noise and vibration levels for high-speed train operation for at-grade and elevated profiles. o Draw a typical noise exposure-vs.-distance curve for source, which will show the project noise exposure as function of distance, and adjust it to account for shielding attenuation from rows of buildings. • Highway portions of the No-Build and Modal Alternative: o Use general assessment noise exposure from Table 2 (consistent with Caltrans protocol) o Construct table for noise sensitive land uses in 1000 ft. study area rating sensitivity/density of structures in impact contour summarizing exposure levels. • No-Build and airport portions of the Modal Alternative: Obtain projections for future aviation operations from Master Plans for major airports and overlay noise contours. • Specify subsequent noise analyses that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis.
	VIBRATION The **Regional Analysis Teams** will • HSR alternatives: Develop representative HSR vibrations using method described in Chapter 8 of the FRA guidance manual: Preliminary Vibration Assessments. o Use a base curve of overall ground-surface vibration as a function of distance from source shown in Figure 8-1 in FRA's *High-speed Ground Transportation Noise and Vibration Impact Assessment* (December 1998). o Apply adjustments to this curve to account for factors such as track support system, train speed, track and wheel condition, building type, and receiver location within building. o Briefly summarize sensitive land uses or structures like dams or reservoirs where ground-borne vibration may exceed impact thresholds. (Use density factor) o Compare the relative percentage of number of vibration-sensitive locations impacted by the HSR alternatives to those impacted under the No-Build Alternative to determine impact attributable to the HSR alternatives. • Highway portions of the No-Build and Modal Alternative: use vibration curves in Figure 4 for ground surface vibration • Specify subsequent vibration analyses that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis.
Mitigation	
• Identify typical feasible mitigation strategies for avoidance and minimization of potential impacts related to noise and vibration.	
Products	
	Program Management Team
▪	• **System-wide Noise and Vibration Report** o Summary o Baseline/Affected Environment ▪ Regulatory Setting ▪ Study Area Setting - Noise o Existing Noise Levels (representative) o Existing Representative Noise-Sensitive Land Uses (densities/percentage of corridor) - Vibration

	o Impacts ▪ Noise - Projected Noise Levels - Noise-Sensitive Land Uses Affected (High, Medium, Low) - Noise Impacts Attributable to HSR Alternative (representative) - Noise Impacts Attributable to Modal Alternative o Highways o Airports ▪ Vibration - Projected Vibration Levels - Vibration-Sensitive Land Uses Affected - Vibration Impacts Attributable to HSR Alternative - Vibration Impacts Attributable to Modal Alternative o Highways o Airports ▪ Subsequent analysis required o Mitigation Strategies

ENERGY

Baseline

Topic Areas	*Study Area*	*Methodology*
• Existing energy sources, demand, capacity, and supply o Petroleum, Nat. gas, Electricity • Transportation Use	• Major intercity travel routes and airports, as defined in the No-Build Alternative	The **Program Management Team** will • Discuss regulatory setting • Characterize overall state setting for demand, capacity (see utilities), source/supply for petroleum, natural gas, electricity • Characterize the transportation-related energy consumption for the state (BTUs per passenger mile)

Impacts

Topic Areas	*Methodology*
• Operational Impacts o Energy requirements & use o State energy supplies/ resources o Peak demand for electricity • Construction Impacts o Energy requirements & use o State energy supplies & resources o Peak demand for electricity	The **Program Management Team** will describe • Direct (operational) energy consumption o Calculate direct (operational) energy consumption by operation of vehicles ▪ Consider annual systemwide VMT for autos, trucks, busses, light-rail transit, commuter rail, and intercity rail using CRA data ▪ Consider passenger miles for commercial airplanes and high-speed trains ▪ Consider variation of fuel consumption rates by vehicle type o Discuss alternatives' energy requirements and use by amount & fuel type (in BTUs and barrels of oil) o Discuss alternatives' effect on forecasted state energy supplies and resources and need for additional capacity (if any) o Discuss alternatives' peak demand during peak and base periods • Indirect energy consumption o Use Input-Output Method to calculate energy consumptions in BTUs and barrels of oil o Discuss alternatives' one-time energy requirement for construction (in BTUs and barrels of oil) o Discuss alternatives' effect on forecasted state energy supplies and resources and need for additional capacity (if any) • Estimate energy demand for growth scenarios • Discuss qualitatively alternatives' construction electrical demand during peak and base period • Provide data to allow comparison of impacts at a regional level, for specific High-Speed Train Corridors and Station Options • Subsequent energy analysis will be required for all projects. Discuss additional analysis required at the project level

Mitigation

- Identify mitigation measures to be incorporated into project designs to reduce energy impacts

Products

Program Management Team

- **System-wide Energy Report**
  - Executive Summary
  - Baseline/Affected Environment
    - Regulatory Setting
    - Study Area Setting
      - Existing Energy Sources, Demand, Capacity, and Supply
        - Petroleum, Natural Gas, Electricity
      - Transportation-related Energy Consumption
  - Impacts

- Operational Impacts (tables for No-Build, Modal, and HSR Alternatives)
- Construction Impacts (tables for No-Build, Modal, and HSR Alternatives)
- Subsequent Analysis

o Mitigation Strategy

EMI/EMF

Baseline

Topic Areas	*Study Area*	*Methodology*
• Populations susceptible to EMI/EMF effects • Telecommunication facilities susceptible to EMI/EMF effects • Signaling equipment susceptible to EMI/EMF effects	100-foot on each side of the right-of-way limits of the HSR corridors and support facilities (note: study area not required for the other alternatives)	**The Program Management Team** will • Define EMI and EMF • Identify populations within the study area that would be susceptible to EMI/EMF effects using Census block data • Identify telecommunications facilities within the study area that would be susceptible to EMI/EMF effects • Identify signaling equipment within the study area that would be susceptible to EMI/EMF effects

Impacts

Topic Areas	*Methodology*
• Typical impacts of EMI/EMF • HSR traction power supply and electric utility system effects • Permissible values comparison • Potentially impacted population, telecommunications, signaling • Subsequent environmental analysis required	Note: EMI/EMF impacts are exclusive to the HSR Alternative. No analysis of the No-Build or Modal Alternatives will be necessary, but a brief statement for each alternative will be included, noting that EMI/EMF impacts would not occur. **The Program Management Team** will • Identify the effects of EMI/EMF can have on people, telecommunications, and signaling • Check the admissibility of effects on humans, signaling, and telecommunications systems and equipment of HSR traction power supply and electric utility systems by calculating: o Longitudinal voltage (longitudinal EMF) o Psophometric voltage o Ground potential rise o Charging current • Compare results to permissible values • Identify locations where EMI/EMF above permissible values would potentially impact people, telecommunications, and signaling • Specify subsequent EMI/EMF analyses that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis.

Mitigation

- Identify mitigation strategies for avoidance and minimization of potential impacts related to EMI/EMF

Products

Program Management Team

- **System-wide EMI/EMF Report**
  - Executive Summary
  - Baseline/Affected Environment
    - Definitions
    - Populations within the study area
    - Telecommunications within the study area
    - Signaling equipment within the study area
  - Impacts
    - Typical effects of EMI/EMF

- EMI/EMF calculations
- Permissible levels comparison
- Potential impacts to populations, telecommunications, signaling equipment
- Subsequent EMI/EMF analysis required

o Mitigation Strategies

BIOLOGICAL RESOURCES & WETLANDS

Baseline

Topic Areas	*Study Area*	*Methodology*
• Vegetation Communities o Sensitive Vegetation Communities (based on CNDDB) • Wildlife (sensitive only) o Invertebrates o Fishes o Reptiles and Amphibians o Birds o Mammals o Wildlife Movement/ Migration Corridors • Threatened and Endangered Species (incl. proposed T,E and CNPS list 1b) • Jurisdictional Waters/Wetlands	• 0.5-mile around stations and on both sides of corridors • Database searches: o 1000-foot around stations and on both sides of the corridors in developed areas o 0.25-mile around stations and on both sides of the corridors in undeveloped areas o 0.50-mile around stations and on both sides of the corridors in sensitive areas (lagoons and wildlife corridors)	• **Program Management Team:** Provide GIS database on false color imaging overlays of available information for sensitive vegetation communities, sensitive species, wildlife movement corridors, and jurisdictional waters/wetlands. o Coordinate with USFWS, CDFG, USACOE, RWQCBs, EPA, CalEPA, and CCC o Describe relationship to NEPA/404 process/FESA/CESA. • Provide text describing the key sensitive biological resources and potentially jurisdictional waters/wetlands regulatory setting • **Regional Analysis Teams**: Refine GIS database overlays based on regional knowledge, local studies, etc. o Update GIS; provide other maps and digitized data to PM team o Present in tabular form; identify data sources and date of information o Provide narrative summary o Describe wetland value and function and types of wetlands (where information exists) o Quantify in acres where numbers are available o Identify where data gaps are for high-probability wetland areas in corridors

Impacts

Topic Areas	*Methodology*
• Vegetation Communities o Sensitive Vegetation Communities (based on CNDDB) • Wildlife (sensitive only) o Invertebrates o Fishes o Reptiles and Amphibians o Birds o Mammals o Wildlife Movement/ Migration Corridors • Threatened and Endangered Species (incl. proposed T,E, and CNPS list 1b) • Jurisdictional Waters/Wetlands	**Regional Analysis Teams** will • Identify approximate range of acres of each vegetation community that may be affected by the No-Build, Modal, and HSR Alternatives. o Distinguish between temporary construction-related impacts and permanent, long-term impacts • Identify wildlife species and the range of acres of wildlife habitat that may be affected by the No-Build, Modal, and HSR Alternatives (to the extent possible). • Identify potential impacts to wildlife movement/migration corridors and identify species potentially using the corridor based on available information for the No-Build, Modal, and HSR Alternatives. • Identify habitat suitable for sensitive species and the range of acres of habitat and number of sensitive species habitat that may be affected by the No-Build, Modal, and HSR Alternatives (to the extent possible) • Identify range of acres of potential impacts to wetlands and waters under the jurisdiction of the CDFG and USACOE for the No-Build, Modal, and HSR Alternatives. o Estimate linear distance and approximate acreage of potential permanent and temporary (construction-related) impacts • Specify subsequent biological analyses that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis

Mitigation

- Identify mitigation strategies for avoidance and minimization of potential impacts to resources

Products	
Regional Analysis Teams	***Program Management Team***
• **Regional Biological Resources Baseline Report:** o Information maps to update GIS layers for vegetation communities, sensitive species, wildlife movement corridors, and jurisdictional waters/wetlands o Tables for vegetation communities, sensitive species, wildlife movement corridors, and jurisdictional waters/wetlands (sensitive only) o Narrative summary of vegetation communities, sensitive species, wildlife movement corridors, and wetlands (focus on high impact potential) • **Regional Biological Resources Impacts Report** o Vegetation communities impacts tables (by alternative) o Wildlife species/habitat impacts tables (by alternative) o Wildlife movement corridors impacts tables (by alternative) o Sensitive species impacts tables (by alternative) o Jurisdictional waters/wetlands impacts tables (by alternative)	• **System-wide Biological Resources & Wetlands Report** o Executive Summary o Baseline/Affected Environment ▪ Regulatory Setting ▪ Study Area Setting (sensitive resources) - Vegetation Communities - Wildlife and Wildlife Habitat - Wildlife Movement Corridors - Sensitive Species - Jurisdictional Waters/Wetlands o Impacts ▪ Vegetation Communities (including tables by alternative) ▪ Wildlife and Wildlife Habitat (including tables by alternative) ▪ Wildlife Movement Corridors (including tables by alternative) ▪ Sensitive Species (including tables by alternative) ▪ Jurisdictional Waters/Wetlands (including tables by alternative) ▪ Subsequent Analysis o Mitigation Strategies (Program MOA for Tier 2)

GEOLOGY, SOILS, SEISMICITY

Baseline

Topic Areas	*Study Area*	*Methodology*
• Topography, Geology, Soils o Topography o Geologic Formations o Soils - Erosion Potential - Shrink/Swell Potential - Corrosivity • Faults and Seismicity o Faults (Active) o Ground Motion o Liquefaction o Other Seismic Hazards - Tsunami & Seiches - Inundation - Mapped Landslides • Mineral Resources • Oil Fields/Naturally Occurring Subsurface Gases • Sedimentary Rock Units • Sole Source Aquifers	• Topography: location of the alternatives (see below) • Geology: location of the alternatives (see below) • Soils: location of the alternatives (see below) • Faults/Seismicity: within 5 miles of alternative • Mineral Resources: within 5 miles of alternative • Oil Fields/Subsurface Gases: within 5 miles of alternative • At-grade sections: 150 feet each side of defined corridor limits • Tunnel and cut-and-cover sections: 200 feet each side of tunnel/cut-and-cover area • Cut and fill sections: 150 feet beyond slope • Aerial sections: 150 feet each side of track limits	▪ **Program Management Team** will provide regulatory setting, plans/profiles • **Regional Analysis Teams:** Characterize the topography, geology, and soils within the study area for each of the alternatives (No-Build, HSR, and Modal) o Topography **–** Using plans/profiles and USGS DEMs in GIS give a range of elevations along alternatives and facilities (take at least 5 sample readings per alternative, present in table identifying location, and approximate elevation above mean sea level) o Geology – provide a general discussion of the geographic regions and sub-provinces traversed by alternatives and facilities (utilize STATSGO, USGS, CDMG, and other sources) o Soils – utilize STATSGO GIS data to identify most common soil associations with study areas, classification, permeability, parent material (provide in table). Discuss potential project impact(s) and available mitigations for project in general (not to be included in table) • Characterize the faulting and seismicity within the study area for each of the alternatives (No-Build, HSR, and Modal) o Active Faults – Using CGS Alquist-Priolo Earthquake Fault Zones GIS data, identify faults within the area considered capable of ground rupture; data review and discussion should include potential rupture displacement, direction, slip rate (mm/year), and should include cross-section where intersecting proposed tunnel segments. o Ground Motion – Incorporate into above table the length of alignment and proposed stations in high ground motion areas, based on Upper Bound Earthquake (UBE; 5% probability of exceedance in 50 years). o Liquefaction – Identify areas potentially susceptible to liquefaction based on statewide geologic map unit susceptibility in conjunction with UBE map; Assume potential saturation until future phases can address shallow groundwater potential on a project-specific basis. o Other Seismic Hazards - Tsunami & Seiches – utilize existing data from USGS, CDMG, local and county general plans to describe the potential for tsunamis and seiches to occur within the study areas - Inundation – identify water retaining structures located within study area that have the potential to induce flooding • Characterize areas of potential slope instability and landsliding based on statewide geologic map unit susceptibility in conjunction with slope gradients derived from DEMs; Compare results to any available existing landslide mapping to verify use of appropriate unit strength/slope gradient criteria • Identify alignments/stations within statewide geologic map units of known difficult excavation characteristics • Characterize the mineral resources within the study area for each of the alternatives (No-Build, HSR, and Modal) • Identify the oil fields/naturally occurring subsurface gas locations and describe the extent of the fields within the study area for each of the alternatives (No-Build, HSR, and Modal)

Impacts

Topic Areas	*Methodology*
• Same as for Baseline	• **Regional Analysis Teams:** Utilize figures relating geologic/topographic features to the project for each alternative. • Identify potential impacts based on topic areas and project cross sections. o Present in table format; include cut and fill estimated volume • For each alternative (No-Build, HSR, and Modal) o Topography – Using USGS DEMs in GIS identify locations where the alternatives would result in a change in topography within the study area o Geology – qualitatively describe the potential issues associated with various geologic units traversed by the alternatives; consider type of construction (tunnel, cut-and-cover, excavation difficulty (blasting) etc.) o Soils – Discuss erosion potential, shrink/swell soils, and/or steel corrosivity/concrete sulfate reaction potential associated with soil units mapped along alignments/stations. Utilize maps to identify locations where operation and construction could be affected. o Liquefaction potential rank as High, Medium, Low, where high formational susceptibility rating at average PGA and moderate where PGA> 30%. o Active Faults – Utilize maps to identify locations where operation and construction could be affected by faults. Describe potential impacts associated with ground motion and liquefaction. Identify locations where alternatives are crossed by an active faults and/or in areas with a high potential for liquefaction (provide in map/table) o Ground Motion – Utilize maps to identify locations where operation and construction could be affected by high ground motions. o Other Seismic Hazards – Utilize plan/profiles to identify locations where operation and construction could be affected by seismic hazards (tsunamis and seiches, inundation, landslides). Describe the potential impacts that could occur given the type of structure or location of a facility. o Describe the potential impact that the alternatives could have during construction and operation on existing mines within the study area o Describe the potential impact that the alternatives could have during construction and operation on oil fields/naturally occurring subsurface gas locations within the study area • Specify subsequent geologic analyses that will be required for all projects. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis

Mitigation

- Identify mitigation strategies to be incorporated into project designs to reduce geological impacts

Products

Regional Analysis Teams	*Program Management Team*
• **Regional Geology Baseline Report:** o Topography, Geology, Soils ▪ Topography ▪ Geologic Formations ▪ Slope Stability ▪ Soils - Erosion Potential - Shrink/Swell Potential - Corrosivity o Faults and Seismicity ▪ Faults (Active) ▪ Ground Motion ▪ Liquefaction Potential	• **System-wide Geology Report** o Executive Summary o Baseline/Affected Environment ▪ Regulatory Setting ▪ Study Area Setting • Topography • Geologic Formations • Slope Stability • Soils o Erosion Potential o Shrink/Swell Potential o Corrosivity

- Other Seismic Hazards
  - Tsunami & Seiches
  - Inundation
  - Landslides
- Mineral Resources
- Oil Fields/Naturally Occurring Subsurface Gases

- **Regional Geology Impacts Report**
  - Topography, Geology, Soils
    - Topography
    - Geologic Formations
    - Slope Stability
    - Soils
      - Erosion Potential
      - Shrink/Swell Potential
      - Corrosivity
  - Faults and Seismicity
    - Faults
    - Ground Motion
    - Liquefaction
    - Other Seismic Hazards
      - Tsunami & Seiches
      - Inundation
      - Landslides
  - Mineral Resources
  - Oil Fields/Naturally Occurring Subsurface Gases

- Faults and Seismicity
  - Faults
  - Ground Motion
  - Liquefaction Potential
  - Other Seismic Hazards
- Mineral Resources
- Oil Fields/Naturally Occurring Subsurface Gases

- Impacts
  - Topography
  - Geologic Formations
  - Slope Stability
  - Soils
    - Erosion Potential
    - Shrink/Swell Potential
    - Corrosivity
  - Faults and Seismicity
    - Faults
    - Ground Motion
    - Liquefaction
    - Other Seismic Hazards
  - Mineral Resources
  - Oil Fields/Naturally Occurring Subsurface Gases
  - Subsequent Analysis
- Mitigation Strategies

HAZARDOUS MATERIALS / WASTES

Baseline

Topic Areas	*Study Area*	*Methodology*
• National Priority List (NPL)/Superfund • State Priority List (SPL) (i.e., Annual Work Plan [AWP] sites) • Solid Waste Landfills (SWLF)	Database search limits: • Within 250-ft of Centerline for: o NPL/Superfund o SPL o SWLF	• **Program Management Team:** Provide text describing the regulatory setting: provide existing GIS layer. • Perform a database search in GIS using the most recent databases as obtained from Environmental Data Resources, Inc. (EDR) for NPL, SPL (i.e., AWP) and SWLF (2002). o Perform searches as identified under "Study Area" in this table o Reference sources using name, effective date, and site reference information o Document NPL, SPL, and SWLF sites as GIS overlay with reference numbers o Document sites in tabular form, referenced to GIS database o Describe the Hazardous Materials used in operation, maintenance and construction of the HSR, highway, and airport improvements; and existing rail facilities

Impacts

Topic Areas	*Methodology*
Superfund sites Statewide Priority List sites	• **Regional Analysis Teams:** Identify the number of known NPL, SPL, and SWLF sites that fall within the 250-foot buffer area for the No-Build, Modal, and HSR Alternative and the number of sites by type. • Assess and describe the potential impacts of the alternative facilities on these sites and the potential delays for property acquisition of the identified sites on the implementation of the particular improvements. Describe reduced non-point source pollutants from mode shift from automobiles • Specify subsequent hazardous materials/wastes analyses that will be required for all projects (Phase I study). Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis

Mitigation

Identify mitigation strategies to be incorporated into project designs and methods of construction to reduce impacts related to hazardous materials/wastes, include typical BMPs

Products

Regional Analysis Teams	*Program Management Team*
• **Regional Hazardous Materials/Wastes Baseline Report:** o Database Descriptions o Database Results ▪ Tables (with weighting of High, Medium, Low rating by segment/stations in Region) ▪ Mapping input to PM team GIS layer • **Regional Hazardous Materials/Wastes Impacts Report** o National Priority List/Superfund Sites Potentially Affected by Alternatives o Statewide Priority List Sites Potentially Affected by Alternatives o Solid Waste Landfill Sites Potentially Affected by Alternative o Potential impacts of the identified sites on the implementation of the Alternatives	• **System-wide Hazardous Materials/Wastes Report** o Executive Summary o Baseline/Affected Environment ▪ Regulatory Setting ▪ Study Area Setting - Database Descriptions - Database Results o Impacts ▪ Sites Potentially Affected by Alternatives - Sites Potentially Affected by Alternatives by Type ▪ Subsequent Analysis o Mitigation Strategies

REGIONAL AND STATEWIDE GROWTH INDUCEMENT

Baseline

Topic Areas	*Study Area*	*Methodology*
• Population shifts • Economic mix • Businesses • Tourism/visitor activity	All counties in study area for statewide system	This analysis will be completed by the **Program Management Team** • Assemble existing conditions data for population, economic mix, business, and tourism/visitor activity • Assemble data forecasts on existing economic mix, economic growth, population growth, and tourism/visitor activity growth forecasts for the broad HSR region. • Assemble corresponding dataset for entire state.

Impacts

Topic Areas	*Methodology*
• Regional (corridor) economic growth effects o Population o Economic comparison o Business sensitivity o Visitor access o Congestion and agglomeration effects • Statewide Economic Growth Effects, shift in population and business centers	This analysis will be completed by the **Program Management Team** • Apply economic development assessment tool to evaluate comparative differences in economic mix, economic growth, population growth, and tourism growth forecasts between the HSR and the No-Build and Modal alternatives. o Distinguish between differences among key industry segments that generate disproportionately high portions of HSR ridership. o Identify the extent to which economic mix and growth differences are reflected in current HSR forecasting procedures. • Apply a transportation reliance analysis tool to assess the relative reliance of various business sectors upon inter-city (air or ground) travel by workers and visitors/customers. o Identify the extent to which HSR will offer lower business costs without a commensurate loss in access. o Identify the extent to which HSR will offer access to wider customer, labor and service delivery markets • Apply tourism information and forecasts to identify current and potential future expansion of tourism and convention/visitor activities in the HSR region, over and above the business cost and customer market effects. • Identify the extent to which HSR provides an alternative to bypass congested highway corridors or congested urban road networks. o Review and revise, as appropriate, previous highway and air travel time assumptions from original HSR demand estimates. o Apply congestion impact assessment tool developed from the NCHRP study to identify extent of any additional business benefits associated with the bypassing of road congestion. • Use a specifically calibrated version of the REMI model to forecast impacts on the competitiveness of business locations within the HSR region compared to the rest of the state and the rest of the U.S. and the No-Build and Modal alternatives. • Use the REMI model to explicitly distinguish business expansion and location shifts among the following areas: HSR corridor region, the state, the country. o Split the countywide induced economic growth between inter-county shifts within the state and net attraction of activity to the state. o Distinguish direct effects of business cost savings within the HSR region from the indirect or “downstream” economic effects of increased business for suppliers of products and services.

Products

• **Program Management Team**: Systemwide comparison of population shifts and business/employment shifts for the No-Build, Modal, and HSR Alternatives,
: County-level population and employment projections for the No-Build, Modal, and HSR Alternatives.

Local Area Growth, Development, Planning, Land Use, Socioeconomics, & Environmental Justice

Baseline

Topic Area	*Study Area*	*Methodology*
• Existing land use • Planned land use and land use policy (in station areas only) • Development patterns for employment and population growth • Demographics • Communities and Neighborhoods • Housing • Economics	• 0.25 mile buffer on either side of the corridors and around facilities • Census block groups crossed by this buffer (for population, household, ethnicity and income) • Regional (as defined by MPO, county boundary or statewide economics)	**Program Management Team** will provide: • Definition of study area facilities • Land use database as GIS overlay • Aerial maps of plan view • Profiles for HSR • Census tract/block data (2000) **Regional Land Use Analysis Teams** will provide background data to support Setting description: • Utilize information gathered during feasibility studies and update as necessary • GIS databases available from counties, MPOs for study areas provided to PM team • Gather local and regional (MPO) land use policies in station facility study areas • Provide planned land uses per most recent general plan in facility study areas to PM for import to GIS • Provide text describing the regulatory setting for station areas only • Identify population characteristics to document recent past, existing, and future (2020) conditions to show trends at the county-level (using Census and MPO information). o Population ▪ Recent historic population and trends (regional MPO's) ▪ Population growth (Calif. Dept. of Finance) o Household size and composition (existing conditions only) o Ethnicity, to identify minority populations (existing conditions only) o Income, to identify low-income populations (existing conditions only) o Qualitatively c • Generally characterize existing neighborhoods and communities within the study area (from aerial photos), focusing on segments not in existing transportation corridors. • Describe housing in the study area o Type of housing (single-family, multi-family) The **Program Management Team** will • Describe the economic conditions of the study area at the regional level o Types of goods and services produced o Types of markets served o Reliance on particular business for economic vitality o Tax revenue and major contributors o Economic centers o Major industries and types of skills needed o Jobs/housing balance Describe statewide economic conditions

Impacts	
Topic Areas	***Methodology***
• Accommodation of projected growth within currently urbanized area under all alternatives. • Land use compatibility near stations and ancillary facilities. • Growth inducement near HSR stations. Modal preferences of new businesses and residents under each alternative. • Environmental justice • Community impacts o Community cohesion o Community facilities o Public services • Displacements Economics	• **Regional Land Use Analysis Team** will describe determine general compatibility issues of proposed station sites and other ancillary facilities under the HSR alternative. o Based on existing land use and currently adopted local and regional (MPO) land use planning policies (when available); o Prepare narrative summarizing potential inconsistencies (where and why). • **Program Management Team** will assess local area growth and development impacts of the non-HSR alternative(s): major airport expansion and system interchange additions under the Modal alternative: o Identify local growth and development parameters under market trend conditions. o Apply market trend parameters to employment and population growth projections to estimate growth within currently urbanized areas and likelihood of land use conversion from non-urban to urban uses. (low density to high density) • **W**ill assess local area growth and development impacts of the HSR alternative: o Research economic development impacts related to HSR development in other areas; o Estimate differential accessibility benefits and model preferences for businesses classes based on proximity to HSR; o Estimate changes to local market trend parameters in "HSR station area" o Apply market trend parameters to employment and population growth projections to estimate growth within currently urbanized areas and likelihood of land use conversion from non-urban to urban uses. (low density to high density) **Program Management Team** will specify subsequent land use/development/planning/growth analysis that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis. The **Regional Analysis Team** will • Determine if minority or low-income populations would be adversely affected by project alternatives o Low income based on household income data below $13,359 (if using 1990 U.S. Census data) or $17, 603 (if using 2000 U.S. Census data) for a family of four. o Minorities are non-white populations, including Hispanic. o Identify disproportionate impacts The **Program Management Team** will • Address system-wide economic impacts, regional economic impacts, fiscal/tax impacts, and effects on jobs/housing balance o Discuss whether businesses would be relocated either out of state or out of region with implementation of alternatives o Discuss how economic base for region and state would be affected. o Discuss changes in market segments served and access to goods and services o Discuss changes in regional tax base and property values • Specify subsequent analyses that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis. The **Regional analysis Teams** will

	• Discuss types of community cohesion impacts, including isolation (physical or perceptual), wall or barrier effects. • Briefly describe community facility impacts • Displacements o Describe magnitude of displacements as "high," "medium," or "low" in terms of acreage and as residential or non-residential. Specify subsequent analyses that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis.
Mitigation	
• **Program Management Team** will identify mitigation strategies to be incorporated into project designs to reduce impacts related to land use inconsistency. • **Program Management Team** will identify and analyze regulatory strategies for a "market intervention" scenario to address local area growth and development impacts. • **Regional Analysis Teams** will identify mitigation strategies for avoidance and minimization of potential impacts related to communities, socioeconomics, and environmental justice.	
Products	
Regional Analysis Team	***Program Management Team***

Local Area Growth, Development, Planning, Land Use, Socioeconomics and Environmental Justice Technical Report
  o Baseline/Affected Environment (Summary Tables & Supporting Text) General Characterization of Population
  o Neighborhoods and Communities along segments outside existing transportation corridor
  o Housing
  o Ethnicity
  o Income
  o Economics
Impacts (Summary Tables & Supporting Text)
  o Land Use Compatibility for stations
  o Environmental Justice
  o Community Cohesion
  o Displacements
  o Subsequent Analysis Required
	• **Local Area Land Use Resources:**
	  o Existing Land Use: Adjusted GIS database/overlay of existing land use near:
	  ▪ Potential sites of major airport expansion and interstate highways additions; and,
	  ▪ HSR stations and ancillary facilities.
	  o Planned Land Use: GIS database of planned land use near HSR stations and ancillary facilities.
	  ▪ Potential sites of major airport expansion and system interchange additions; and,
	  ▪ HSR stations and ancillary facilities.
	• **Final Local Area Growth, Development, Planning, Land Use, Socioeconomics and Environmental Justice Report**
	  o Executive Summary
	  o Baseline/Affected Environment
	  ▪ Regulatory Setting
	  ▪ Study Area Setting
	  - Existing Land Use
	  - Planned Land Use and Land Use Policies
	  ▪ Population Characteristics
	  ▪ Neighborhoods and Communities Characteristics
	  ▪ Housing
	  ▪ Ethnicity
	  ▪ Income
	  ▪ Economics
	  - Local and Regional
	  - System-wide
	  o Impacts
	  ▪ Land Use Compatibility and Policy Consistency for No-Build, Modal, and HSR
	  ▪ Projected Local Area Growth & Development under the No-Build, Modal, and

	HSR Alternatives ▪ Projected New Development for No-Build, Modal, and HSR Alternatives ▪ Environmental Justice ▪ Community Facilities ▪ Public Services ▪ Displacements ▪ Economic Impacts ▪ Subsequent Analysis Required • Mitigation Strategies

AESTHETICS & VISUAL QUALITY

Baseline

Topic Areas	*Study Area*	*Methodology*
• Viewshed • Sensitive Visual Resources	• 0.25-mile , except as refined by Regional Analysis Teams	• **Program Management Team:** Provide a GIS topography layer, aerial photos of HSR and Modal alternative shown in plan view (and profile for HSR) • **Regional Analysis Teams:** o Select sensitive landscapes in Region as representative of typical landscapes, considering topography, vegetation, and existing built environment, based on aerial photographs and topo maps ▪ Reduce or expand study area, if necessary, but do not expand it beyond one mile ▪ Select sensitive viewing point for each representative landscape o Identify locations of typologies and viewing points (showing direction of landscape from viewing point with arrow) on Plan and Profile Map and submit to PM Team to create GIS typology overlay layer for Visual Resources. o Use 35mm camera with 50mm lens to take typical photos of each landscape typology o Identify representative sensitive visual resources (such as scenic highways, historic districts/buildings, coastal bluffs/beaches, important views, distinctive architecture, local landmarks), o Describe the dominant visual/landscape features in each photo (line, color, form, texture)

Impacts

Topic Areas	*Methodology*
• Physical Changes • Changes to dominant features in landscape as Impacts to Sensitive Visual Resources •	• **Program Management Team:** Develop a standardized visual compatibility matrix, showing ranking of high, medium, or low to indicate the extent of physical changes as they relate to typologies, viewer groups, and visual resources to dominant landscape features o Create photosimulations of both elevated and at-grade high speed rail alternatives superimposed on representative landscape photos to regional teams for analysis. • **Regional Analysis Teams:** o Provide analysis of visual impacts of physical changes, o Complete visual compatibility matrix. o Briefly describe in text the potential visual impacts to sensitive typologies for each alternative. o Summarize potential visual impacts to sensitive visual resources for each alternative. Describe changes to the existing dominant line, form, and texture (e.g., does the proposed improvement (rail, highway, airport) obstruct an existing view or does it detract from or contrast with the dominant visual features?). o Specify subsequent visual quality analyses that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis. o

Mitigation

- Identify mitigation strategies to be incorporated into project designs to reduce impacts related to aesthetics and visual quality

Products

Regional Analysis Teams	*Program Management Team*
• **Regional Aesthetics and Visual Quality Baseline Report:**	• **System-Aesthetics and Visual Quality Report**

o Landscape Typologies-describe how and why selected to represent typical landscapes in region o Representative photos of landscape typologies o Sensitive viewing points (on map) • **Regional Aesthetics and Visual Quality Impacts Report:** o Potential Visual Impacts (based on compatibility summary matrix provided by Program Management Team) o Summary of Impacts to Sensitive Landscape Typologies o Subsequent Analysis Required	o Executive Summary o Baseline/Affected Environment ▪ Study Area Setting - Characterize Sensitive Landscape Typologies - Sensitive Visual Resources by region o Impacts for each Alternative by Region ▪ Physical Changes to dominant landscape features ▪ Impacts to Sensitive Landscape Typologies (including simulations) ▪ Subsequent Analysis o Mitigation Strategies

AGRICULTURAL RESOURCES / FARMLANDS

Baseline

Topic Areas	*Study Area*	*Methodology*
• Prime Farmland • Farmland of Statewide Importance • Unique Farmland • Farmland of Local Importance • Resource Conservation District • Land Under Williamson Act	• 100-foot on each side of the right-of-way limit and boundaries of facilities	**Program Management Team will provide analysis as follows:** • Provide text describing the regulatory setting; Provide GIS database • Identify Prime Farmlands, Farmlands of Statewide Importance, and Unique Farmlands as established by the Department of Conservation, using the FMMP database (GIS). • Identify Farmlands of Local Importance, and Williamson Act lands as established by the Department of Conservation, using the FMMP database (GIS). • Identify Resource Conservation Districts, as established by the Department of Conservation, using *California's Resource Conservation Districts Table*. o Contact local agencies to determine if there are any established policies concerning farmland conversion to other land uses o Document policies • Coordinate with the National Resource Conservation Service regarding Farmland Protection Policy Act

Impacts

Topic Areas	*Methodology*
• Prime Farmland • Farmland of Statewide Importance • Unique Farmland • Farmland of Local Importance • Resource Conservation District	**Program Management Team will provide analysis as follows:** • Determine the number of acres/hectares of Prime Farmland that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Prime Farmland database and the project plans (for No-Build, Modal, and HSR Alternatives) • Determine the number of acres/hectares of Farmlands of Statewide Importance that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Farmlands of Statewide Importance database and the project plans (for No-Build, Modal, and HSR Alternatives) • Determine the number of acres/hectares of Unique Farmland that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Unique Farmland database and the project plans (for No-Build, Modal, and HSR Alternatives) • Determine the number of acres/hectares of Farmlands of Local Importance and Williamson Act lands that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Farmlands of Local Importance database and the project plans (for No-Build, Modal, and HSR Alternatives) • Determine the number of acres/hectares of Resource Conservation District lands that would be converted for project use or severed by the proposed improvement based on an overlay of the GIS Farmlands of Resource Conservation Districts and the project plans (for No-Build, Modal, and HSR Alternatives) • For specific HSR Alternative corridors/segments, provide data to **Regional Analysis Teams** to identify areas of concern and comparison of impacts. Identify and describe farmland impacts, both displacement and severance and associated costs. • Specify subsequent agricultural resources and farmlands analyses that will be required for all projects. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis. • Coordinate with NRCS and prepare Farmland Conversion Impact Rating (provide data to NRCS) • Provide data to allow comparison of impacts at a regional level, for specific High-Speed Train Corridors and Station Options.

Mitigation

Identify mitigation strategies to be incorporated into project designs to reduce impacts related to agricultural resources and farmlands

Products
Program Management Team
• **Agricultural Resources and Farmlands Report** o Executive Summary o Baseline/Affected Environment (GIS database and summary tables) ▪ Regulatory Setting ▪ Study Area Setting - Prime Farmland - Farmland of Statewide Importance - Unique Farmland - Farmland of Local Importance and Williamson Act land - Resource Conservation District Impacts o Impacts (Summary tables for each alternative and option – system-wide and by region) ▪ Prime Farmland ▪ Farmland of Statewide Importance ▪ Unique Farmland ▪ Farmland of Local Importance ▪ Resource Conservation District Impacts ▪ Subsequent Analysis o Mitigation Strategies

HYDROLOGY & WATER QUALITY

Baseline

Topic Areas	*Study Area*	*Methodology*
• Regulatory environment • Floodplains • Surface waters • Erosion • Groundwater	• 100-foot (30-meter) buffer on each side of the defined right-of-way limit and boundaries of facilities	• **Program Management Team** will collect basic information about major federal & state programs related to hydrological and water quality issues (regulatory setting) • Provide narrative summary of programs and responsible agencies • Provide GIS layer for Water Resources and Floodplains • **Regional Analysis Teams** will identify local flood control and water districts and develop contacts for coordination. • Collect basic information about regional programs related to hydrology and water quality issues (from RWQCBs) o Provide narrative summary of programs and responsible agencies • Identify 100-year floodplains within study area using FEMA maps and FIRMS to show Special Flood Hazard Areas (SFHAs) o Map as overlay using GIS and SPOT imagery o Provide narrative summary of floodplains in study area, referencing appendix containing mapping • Identify surface waters (lakes, rivers, streams) within study area using USGS quad maps and Hydro 24 blueline and Layer 610 o Map as overlay using GIS and SPOT imagery o Provide narrative summary of surface waters within the study area, referencing appendix containing mapping o Identify CWA 303 (d) listed water bodies • Identify soils susceptible to erosion within the study area using STATSGO GIS databases for identifying highly erodable soils. o Map as overlay using GIS and SPOT imagery o Provide narrative summary of soil erosion potential within the study area, referencing appendix containing mapping • Identify major aquifers, areas with shallow groundwater using USGS Ground Water Atlas of United States. o Map as overlay using GIS and SPOT imagery o Provide narrative summary of hydrogeologic and hydrologic conditions for the major aquifers in the study area, referencing appendix containing mapping

Impacts

Topic Areas	*Methodology*
• Regulatory environment • Floodplains • Surface waters • Run-off • Stormwater management • Erosion • Groundwater	• **Program Management Team** will provide general description of the No-Build, Modal, and HSR alternatives' relationships to major federal, state, and regional regulatory programs. • **Regional Analysis Teams** will identify the potential impacts to 100-year floodplains, using the GIS database layers for the proposed alternatives and the database layer for floodplains. o Quantify impacts and present in tabular form. o Provide narrative summarizing floodplain impacts. • Identify the potential impacts to surface waters, using the GIS database layers for the proposed alternatives and the database layer for surface

	waters. o Quantify impacts (linear impact for streams, area impacts for other water bodies) and present in tabular form. o Provide narrative summarizing surface water impacts. o Address cumulative impacts of vibration on dams, pump stations, and infrastructure. (reference vibration) • Qualitatively address potential flood risks and constituent run-off from additional paved surfaces • Qualitatively address incompatibility with floodplain development and preservation of floodplain values– prepare Floodplain Risk Assessment for alternatives • Qualitatively assess the affects to the hydraulics of tidal lagoons. • **Program Management Team** will provide general discussion of the generic types of surface waters, run-off, stormwater management, and erosion impacts that could result. Identify changes to drainages or watersheds; describe impacts to HCPs. • **Regional Analysis Teams** will identify the potential impacts to groundwater, using the GIS database layers for the proposed alternatives and the database layer for groundwater. o Describe Quantify impacts (area impacts) rank as High, Medium or Low potentially significant and present in tabular for comparative table. o Provide narrative summarizing groundwater impacts. o Consider affect on Department of Water Resources linear features and ground water recharge areas. o Describe potential benefits for reducing non-point source pollutants from reduced VMTs(mode shift from automobile). • Specify subsequent hydrology and water quality impacts that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis.
Mitigation	
• Identify mitigation strategies for avoidance and minimization of impacts to be incorporated into project designs to reduce impacts related to hydrology and water quality	

Products	
Regional Analysis Teams	***Program Management Team***
• **Regional Hydrology & Water Quality Baseline Report:** o Regional Regulatory Environment (requirements of RWQCBs) o Floodplains o Surface Waters o Erosion o Groundwater o Appendices: ▪ A – Floodplain Mapping ▪ B – Surface Water Mapping ▪ C – Soils Susceptible to Erosion Mapping ▪ D –Groundwater • **Regional Hydrology & Water Quality Impacts Report** o Regional Regulatory Environment o Floodplains (tables by alternative o Surface Waters (tables by alternative) o Groundwater tables by alternative)	• **System-wide Hydrology and Water Quality Report** o Executive Summary o Baseline/Affected Environment ▪ Regulatory Setting ▪ Study Area Setting - Floodplains - Surface Waters - Erosion - Groundwater o Impacts ▪ Regulatory Environment (federal, state, regional permits and approvals required for No-Build, Modal, and HSR Alternatives) ▪ Floodplains (impacts for No-Build, Modal, and HSR Alternatives) ▪ Surface Waters (impacts for No-Build, Modal, and HSR Alternatives) ▪ Run-off (general discussion of types of impacts to be quantified in next phase) ▪ Stormwater Management (general discussion of types of impacts to be quantified in next phase) ▪ Erosion (rating of potential impacts as high, medium, or low for No-Build, Modal, and HSR Alternatives) ▪ Groundwater (impacts for No-Build, Modal, and HSR Alternatives) ▪ Subsequent Analysis o Mitigation Strategies

PALEONTOLOGY

Baseline

Topic Areas	*Study Area*	*Methodology*
• Sedimentary Rock Units • Previous Fossil Sites	• 100-foot buffer on all sides of the disturbance area	• **Program Manager:** Provide text describing the regulatory setting Sedimentary Rock Units from geology task • **Regional Analysis Teams:** Define recorded sedimentary rock layers for the study area, based on geologic maps, published by USGS and the California Division of Mines and Geology o Include age and unit type o Include all layers recorded to different depths, keeping in mind the potential for trenching and tunneling in various locations o Record soil types • **Regional Analysis Teams:** Define previously document finds of fossils or other paleontological resources within the study area o Cite and briefly describe o Do not include specific locations in the text.

Impacts

Topic Areas	*Methodology*
• Sedimentary Rock Units • Previous Fossil Sites	• **Regional Analysis Teams:** Classify the potential for paleontological resources to occur in the study area of No-Build, Modal and HSR alternatives, based on soil type/sedimentary layers mapping o Classify as "low" (for geology that is typically not fossil-bearing/non-sedimentary) or "high" (rock units that are determined to have fossil units) or "undetermined" (where no information is available). o Describe in text all areas with "high" potential for fossils o Include graphics illustrating high-potential areas • **Regional Analysis Teams:** Determine whether any of the alternatives are likely to affect previously identified sites, based on previous fossil sites mapping o Consider any extant site within the study area for an alternative as potentially affected o Include general locations only in body of report; include specific locations in appendix, which will not be distributed to the public. • Specify subsequent paleontological resources analyses that will be required for all projects. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis.

Mitigation

- Identify mitigation strategies to be incorporated into project designs to reduce impacts related to paleontological resources

Products

Regional Analysis Teams	*Program Management Team*
• **Regional Paleontological Resources Baseline Report** o Sedimentary Rock Units o Previous Fossil Sites Found with Study Area • **Regional Paleontological Resources Impacts Report** o Sedimentary Rock Units o Previous Fossil Sites Found with Study Area	• **Paleontological Resources Report** o Executive Summary o Baseline/Affected Environment ▪ Regulatory Setting ▪ Study Area Setting - Sedimentary - Previous Fossil Sites Found with Study Area

	o Impacts ▪ Sedimentary ▪ Previous Fossil Sites Found with Study Area ▪ Subsequent Analysis o Mitigation Strategies

CULTURAL RESOURCES

Baseline

Topic Areas	*Study Area (APE)*	*Methodology*
• Prehistoric Archaeological Sites • Historic Archaeological Sites • Historic Structures and Buildings • Ethnographic Resources • Multi-Component Cultural Resources	• 500 feet on each side of the ROW centerline (1000 foot wide corridor) •	• **Program Manager:** • Provide National Park Service GIS database overlay for cultural resources • Provide text describing the regulatory setting • Request a search of the Sacred Lands Files and a list of Native American contacts from NAHC • Request a list of Native American contacts from NAHC • Send letters to Native American contacts requesting comments and concerns about traditional cultural properties (Include map of route in letters) • **Regional Analysis Teams:** • Obtain records searches from the appropriate Information Centers of the California Historical Resources Information System • Request (by telephone) local registers/inventories of historical resources from county and city governments • • Identify and describe the types of archaeological resources (residential bases, cemeteries, lithic scatters, historic refuse deposits, etc.) that may be encountered along each alternative route based on results of the records searches, historical USGS maps, and knowledge of the local pre-history and history • • Document identified resources in table • Show areas of high sensitivity for cultural resources in GIS layers or suitable map; one for archaeological resources, one for structures • Describe the types of archaeological resources that may be encountered (burials, past settlements, etc.) based on knowledge of the local pre-history and history • Conduct contextual-level surveys along proposed corridors and around facilities and identify general areas of development and approximate years of construction (i.e., northwest Visalia 1950-1970) and indicate the potential for eligible historic structures (i.e., high [appears to be pre-1960 or other known eligible resources in area], low [post-1960 or no other eligible resources in area]) o Document in table o Utilize SPOT images to map general areas • Specific site locations of archeological resources should not be included in text or mapping.

Impacts

Topic Areas	*Methodology*
• Prehistoric Archaeological Sites • Historic Archaeological Sites • Historic Structures and Buildings • • Ethnographic Resources	• **Regional Analysis Teams:** Determine the potential for significant impacts as follows for the No-Build, Modal, and HSR alternatives, o Assume high potential for impacts/adverse effects if a resource within the study area is already listed or determined eligible for the NRHP or CRHR or if sacred lands or traditional cultural properties are identified by the NAHC or Native American contacts o Rank alternative routes as having high, medium, or low potential to affect cultural resources based on relative numbers of identified and predicted archaeological sites and structures more than 45 years old o Discuss the general types of impacts/adverse effects that may occur (i.e., take, visual, noise, etc.)

• Multi-Component Cultural Resources	• Compare potential impacts by alternative and type of resource in table form • Specify subsequent cultural resources and Section 106 analyses that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis

Mitigation

- Identify mitigation strategies to be incorporated into project designs to reduce impacts related to cultural resources.
- Propose a programmatic agreement with SHPO that will stipulate how the Section 106 process will be implemented during the next phase of the project.

Products

Regional Analysis Teams	*Program Management Team*
• **Regional Cultural Resources Baseline Report** o Prehistoric Archaeological Sites o Historic Archaeological Sites o Historic Structures and Buildings o Ethnographic Resources o Multi-Component Cultural Resources o • **Regional Cultural Resources Impacts Report** o Potential for impact o	• **Cultural Resources Report** o Executive Summary o Baseline/Affected Environment ▪ Regulatory Setting ▪ Study Area Setting - Prehistoric Archaeological Sites - Historic Archaeological Sites - Historic Structures and Buildings - Ethnographic Resources - Multi-Component Cultural Resources o Impacts (typology of likely presence of cultural resources) ▪ Prehistoric Archaeological Sites ▪ Historic Archaeological Sites ▪ Historic Structures and Buildings ▪ Ethnographic Resources ▪ Multi-Component Cultural Resources ▪ Subsequent Analysis o Mitigation Strategies o Appendix: Native American Contacts

PUBLIC UTILITIES

Baseline

Topic Areas	*Study Area*	*Methodology*
• Electrical facilities • Natural gas lines (high pressure) • Waste water treatment plants	• 100-foot from the centerline and around facilities	**Program Manager** will provide text describing the regulatory setting The **Regional Analysis Teams** will (Map) • Contact major utility providers for information on major facilities in study area, if available • Describe existing electricity service providers in study area region. • Identify existing substations and major transmission lines, (240 KV and above), in the study area. • Identify major high pressure natural gas facilities and major natural gas distribution lines in the study area. (contact State Fire Marshall or Office of Emergency (OES) • Identify major sewer facilities (trunk lines, plants) in the study area.

Impacts

Topic Areas	*Methodology*
• Electrical facilities • Natural gas lines • Waste water treatment plants	The **Regional Analysis Teams** will describe major conflicts with existing utilities and will rank as High, Medium, or Low impact potential by alternative and by segment within region for HSR corridors • Identify substations or major transmission lines that would be affected by the alternatives. • Identify major high pressure natural gas facilities or major natural gas distribution lines that would be affected by the alternatives. • Identify petroleum pipelines in 100 foot corridors • Specify subsequent public utilities analyses that will be required in the next phase.

Mitigation

- Identify mitigation strategies for avoidance and minimization of potential impacts related to public utilities.

Products

Regional Analysis Teams	*Program Management Team*
• **Regional Public Utilities Report:** o Electricity ▪ Service providers ▪ Substations and Major Transmission Lines (240 KV and above) in Study Area o Natural Gas (High Pressure) ▪ Major Facilities and Distribution Lines in Study Area o Waste water treatment facilities	• **System-wide Public Utilities Report** o Executive Summary o Baseline/Affected Environment ▪ Regulatory Setting ▪ Study Area Setting - Electricity • Service Providers • Substations and Major Transmission Lines - High Pressure Natural Gas: Major Facilities and Distribution Lines o Impacts ▪ ▪ Subsequent Analysis Required o Mitigation Strategies

SECTION 4(f) AND SECTION 6(f) PROPERTIES

Note: Section 4(f) and Section 6(f) evaluations are requirements of the Department of Transportation Act of 1966 and Land and Water Conservation Fund Act of 1965 respectively. At the program level, the combined Section 4(f)/6(f) evaluation for this project will be incorporated into the NEPA or CEQA documents as a separate chapter, and as such will not follow the standard format that will identify baseline conditions, impacts, and mitigation. The program document will discuss the regulatory framework of Sections 4(f) and 6(f), list all the Section 4(f) and 6(f) resources in the corridor as known (based on the Cultural Resources and Land Use of the environmental document), and provide a procedural outline for completing more detailed Section 4(f) evaluations and securing Section 6(f) conversion approvals during the subsequent project-level analyses, if deemed necessary (see Regional Analysis Teams section below). In addition, prior and on-going efforts to avoid Section 4(f) and Section 6(f) resources will be disclosed for the record.

Topic Areas	*Study Area*	*Methodology*
• Section 4(f) of the Department of Transportation Act of 1966 • Section 6(f) of the Department of Transportation Act of 1966	As defined by the land use and cultural analyses	The **Program Management Team** will • Define regulatory framework: DOT Act 49 U.S.C. 303(c) o Describe Section 4(f) of the Department of Transportation Act of 1966 o Describe Section 6(f) of the Land and Water Conservation Fund Act of 1965 o Describe the Section 4(f) evaluation process o Describe the Section 6(f) requirements o Identify potential for direct and indirect impacts (presence or absence of resources The **Regional Analysis Team** will • List the Section 4(f) and Section 6(f) resources, as known, by alternative o Parks, recreational lands and refuges from the land use analysis o Cultural resources from the cultural resources section, National Register sites o Historic Sites o Discuss the likelihood of additional resources being identified at the project level (rank at High, Medium, Low potential) • Discuss the prior and on-going efforts of the California High-Speed Train project to avoid Section 4(f) and Section 6(f) projects • Discuss avoidance alternatives or reasons for no prudent or feasible alternative for 4(f) use • Outline the future project-level Section 4(f) Evaluations and Section 6(f) conversion approvals

Products

Regional Analysis Teams	*Program Management Team*
• **Regional Section 4(f) and Section 6(f) Report** o Section 4(f) and Section 6(f) Resources o Prior and On-going Avoidance Strategies o Identify Subsequent Section 4(f) Evaluations and Section 6(f) Conversion Approvals Note: All Section 4(f) and Section 6(f) resources identified within the cultural Area of Potential Effect (APE) (up to 1000 feet from the alignment) and the land use study area (.25-mile from the centerline of the alignment) should be catalogued in the appropriate project databases. However, because many of these resources may not be directly or indirectly affected by the project, identification of them within the cultural resource APE and the study area for land uses does not automatically trigger the need for future project-level Section 4(f) evaluation or a Section 6(f) conversion approval.	• **System-wide Section 4(f) and Section 6(f) Report** o Summary o Regulatory Framework (DOT Act 49 U.S.C. 303(c)) o Section 4(f) and Section 6(f) Resources o Prior and On-going Avoidance Strategies o Describe subsequent Section 4(f) Evaluations and Section 6(f) Conversion Approvals and outline process for approvals

In order to ensure that Section 4(f) evaluations are conducted and Section 6(f) conversion approvals are pursued only as necessary, the regional analysis team is required to coordinate with the program management team concerning the appropriate level of study. Specifically, should a regional analysis team determine that a Section 4(f) Evaluation or Section 6(f) conversion approval is necessary to preserve a corridor at the program level of analysis; commencement of either is subject to the approval of the program manager.	

CUMULATIVE IMPACTS

Impacts

Topic Areas	*Study Area*	*Methodology*
• Regulatory framework • Methodology • Projects included in cumulative analysis • Cumulative analysis by alternative and by topic • Focus on high-risk sensitive resources	• TBD, and will be determined during analysis. May vary with topic, but including at least all of the counties crossed by the alternatives.	The **Program Management Team** will • Describe the regulatory requirements for cumulative analysis (CEQA and NEPA) • Describe cumulative analysis methodology for California High-Speed Train Program EIR/EIS cumulative analysis o Explain the unique nature of the program relative to cumulative analysis ▪ "Build-out" of all planning documents included in No-Build and thus all alternatives. ▪ Use of list method for cumulative analysis, rather than plan method. • Describe other projects included in the list for cumulative analysis (major infrastructure projects, highway, airport, rail improvements) o Project descriptions (location, size, implementation dates, etc.) o Reference sources (environmental documents, etc., from which data is obtained to include in cumulative analysis. o Explain any projects that are not being included and why. • Analyze cumulative impacts for all topics, parallel to other portions of environmental document, focus on high risk resources o Separately analyze the cumulative impacts of each alternative when combined with other projects o For all topics where impacts are known at program level, combine these with impacts from other projects on list ▪ Determine whether the impacts would accumulate (combine together to result in combined impacts) – explain why they would or would not accumulate. ▪ For cumulative impacts, determine whether the impact would be significant or not, using similar methodology as used for program-specific analysis, as described in other methodologies o For topics where impacts cannot be determined at the program level, discuss the potential for significant impact ▪ Specify subsequent analyses that will be required for next phase. Discuss additional analysis that will be required at the project level in such a way that the discussion will function as a partial "scope of work" for subsequent analysis

Mitigation

- Identify mitigation strategies for avoidance and minimization of potential impacts related to cumulative impacts.

Products

Program Management Team

- **Section of the EIR/EIS – to be completed AFTER all topical reports are completed**
  - Executive Summary
  - Regulatory Framework
  - Methodology for California High-Speed Train Program Cumulative Analysis

- Projects Included in Cumulative Analysis
- Cumulative Analysis (by alternative and by topic)
- Subsequent Analysis Required
- Mitigation Strategies

2.19 EXAMPLE COMPARISON TABLES

Data presented are only examples and do not represent any form of analysis.

Example Analysis/Comparison Table
Annual 2020 Direct (Operational) Energy Consumption

	No Build Alternative	Modal Alternative	High-Speed Train Alternative
Passenger Miles1 Auto/Trucks/Bus Commuter Rail Intercity Rail Air	1,000,000 # # # #	1,250,000 # # # #	1,700,000 # # # #
Vehicle Miles Traveled2 Auto/Trucks/Bus Commuter Rail Intercity Rail Air	500,000 # # # #	700,000 # # # #	850,000 # # # #
Kilowatt Hours Consumed[3] (electrified trains)			200,000
BTUs Consumed[4] Auto/Trucks/Bus Commuter Rail Intercity Rail Air	5,200 x 102^{8} # # # #	8,600 x 10^{35} # # # #	6,200 x 10^{30} # # # #
BTUs/Passenger Mile Auto/Trucks/Bus Commuter Rail Intercity Rail Air	5,200,000 # # # #	2,000,000 # # # #	1,500,000 # # # #
BTUs/Vehicle Mile Auto/Trucks/Bus Commuter Rail Intercity Rail Air	500,000 # # # #	300,000 # # # #	200,000 # # # #
Total Barrels of Oil5 Auto/Trucks/Bus Commuter Rail Intercity Rail Air	150,000 # # # #	200,000 # # # #	250,000 # # # #
CHANGE FROM NO-BUILD		50,000	100,000

Notes:
1 – Passenger Miles (*Source*)
2 - Vehicle Miles (*Source*)
3 – Kilowatt Hours (*Source*)
4 - BTU – British Thermal Unit (conversion factor ---) (*Source)*
5 – Barrels of Oil (conversion factor ---) (*Source)*

Data presented are only examples and do not represent any form of analysis.

Example Analysis/Comparison Table
Impacts to Farmland
Bay Area to Merced Region

	Prime Farmland (acres)	Unique Farmland (acres)	Statewide Importance (acres)	Local Importance (acres)	Resource Conservation District (acres)	Total Farmland (acres)
No-Build	#	#	#	#	#	#
Modal	#	#	#	#	#	#
HST Corridor & Station Options	*#-#*	*#-#*	*#-#*	*#-#*	*#-#*	*#-#*
San Jose to San Francisco	*#-#*	*#-#*	*#-#*	*#-#*	*#-#*	*#-#*
Alignments						
-Caltrain	#	#	#	#	#	#
Stations						
-Transbay Terminal	#	#	#	#	#	#
-4th and King				#		
-Millbrae	#	#	#			
-Redwood City	#	#	#			
-Palo Alto	#					
-Santa Clara		#	#	#		
San Jose to Oakland	*#-#*	*#-#*	*#-#*	*#-#*	*#-#*	*#-#*
Alignments						
- Hayward/I-880	#	#	#	#	#	#
- Hayward/ Niles/ Mulford	#	#	#	#	#	#
Stations						
-West Oakland	#	#	#	#	#	#
-12th St/City Center	#	#	#	#	#	#
-Coliseum Bart Station	#	#	#	#	#	#
-Union City	#	#	#	#	#	#
-Fremont	#	#	#	#	#	#
San Jose to Merced	*#-#*	*#-#*	*#-#*	*#-#*	*#-#*	*#-#*
Alignments						
-Diablo Range Direct	#	#	#	#	#	#
-Caltrain/Gilroy Pacheco Pass	#	#	#	#	#	#
Stations						
-San Jose (Diridon)	#	#	#	#	#	#
-Morgan Hill	#	#	#	#	#	#
-Gilroy	#	#	#	#	#	#
-Los Banos	#	#	#	#	#	#
Source: " "						